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Society, and upon the recommendation of a committee appointed from time to time for this purpose, in furtherance of such mathematical interests as

(*a*) The publication of important mathematical books and memoirs,

(*b*) The award of prizes for important contributions to mathematics;

It being further recommended that during the next ten years preference be given to the former and that publication of Professor Moore's researches in General Analysis or in other fields shall have precedence over all other claims.

The fund is to be kept intact by the American Mathematical Society except in so far as it is used to aid in the publication of Professor Moore's researches. For this special purpose a part of the principal, not exceeding one third, may be used, provided the interest on the remainder be allowed to accumulate until the fund has been restored to its original value.

(Here follow the names of 174 contributors.)

CHICAGO, April 25, 1922.

AMONG MY AUTOGRAPHS.

By DAVID EUGENE SMITH, Columbia University.

24. SIR WILLIAM ROWAN HAMILTON AND THE EARLY DAYS OF QUATERNIONS.

It is well known that Sir William Rowan Hamilton (1805–1865) was one of the world's infant prodigies. Professor Alexander Macfarlane tells us of his considerable advancement in arithmetic at the age of three, of his ability to read Latin, Greek, and Hebrew at the age of five, and of his intimate familiarity with Italian, Sanskrit, and Arabic at the age of ten. At twelve he was contesting with Zerah Colburn, the American "calculating boy," and at sixteen he was reading Laplace's *Mécanique Céleste* and pointing out an error in the work of the great French master. He was thirty-eight, however, before he discovered the underlying principles of quaternions and it was not until 1853, ten years later, that he published his lectures on the subject. These lectures, in their initial form, were delivered at Trinity College, Dublin, in 1848.

The letter which follows was written in 1847 and has considerable interest in that it shows Hamilton's scientific activities at this time and refers to the monographs on quaternions which he had already published.

The letter, now in my collection, was written to Dr. James Booth and is as follows:

OBS$^{\text{Y}}$ DUBLIN
March 5th, 1847

My dear Sir

Your note, dated the 12th of January, with its interesting accompaniments, did not reach me till a day or two ago,—which is the cause of its not having been sooner acknowledged. Allow me, as some return, to request your acceptance of my last contribution to the Proceedings of the Royal Irish Academy. There are, I think, some other papers of mine, of later date than any which you are likely to have seen—at least than any which I can have given you in 1845, as I printed several little things last year, availing myself so of the increased leisure gained by my retirement from the chair of the Academy. If, at *your* leisure, you will tell me the date of the last paper of mine on quaternions in your possession, I will try whether I cannot make your set more complete:—since you have done me the honour of addressing the Society of which you are President, on the subject of my researches.

It could not, of course, be otherwise than honourable & gratifying to me, if the Literary and Philosophical Society of Liverpool should think fit, on your recommendation, to elect me a Corresponding Member. I do not know, however, that with the present claims upon my time, I have anything to promise in return.

Should you have mentioned the subject to any of the resident members, I hope that you will tell them that, through some accident, I did not hear of your intention till the day before yesterday.

I remain
my dear Sir
very truly yours
William Rowan Hamilton

Rev. James Booth, LL.D.

QUESTIONS AND DISCUSSIONS.

Edited by C. F. Gummer, Queen's University, Kingston, Ont., Canada.

NEW QUESTION.

The following question should call forth some interesting answers, whether complete or not, from readers having a taste for constructive geometry.

46. A geometrical construction will often become impracticable in special cases where some of the construction points are imaginary, although the final result is real. Is there any system according to which a construction failing in this way may be replaced by one that will work?

For example, let a line l_1 cut a circle c_1 in P_1 and Q_1, and let a line l_2 cut a circle c_2 in P_2 and Q_2. If the four points P_1, Q_1, P_2, and Q_2 are real, the intersections of P_1P_2 with Q_1Q_2 and P_1Q_2 with P_2Q_1 may be found directly. If the four points are imaginary, the intersections named will still be real, and there ought to be a simple way of getting them as the points common to a line and a circle.

DISCUSSIONS.

In Problem-Notes (*1921*, 278) a problem in Skeleton Division, proposed by Professor F. Schuh, was quoted from *Nieuw Tijdschrift voor Wiskunde*, volume 8.

Professor Curtiss shows that this problem has the unique solution 7752341/667334. In Professor Bennett's "Remarks" it is shown that the same conclusion is reached without the assumption of irreducibility. Solutions of a number of puzzles of this kind by W. E. H. Berwick may be found in *The Mathematical Gazette*, January, 1922, pages 8 and 9. In all of these certain digits were given beforehand, and in several cases there is more than one solution. For other references see Note 2, in Problems and Solutions (*1921*, 37).

Mr. Ballantine develops some ideas on linear systems of functions with a view to generalizing the notion of derivative. Considering a Taylor expansion as a linear combination of the successive powers of the variable, he discusses some ways in which a linear combination of a more general sequence of functions may be regarded as a generalized Taylor expansion.